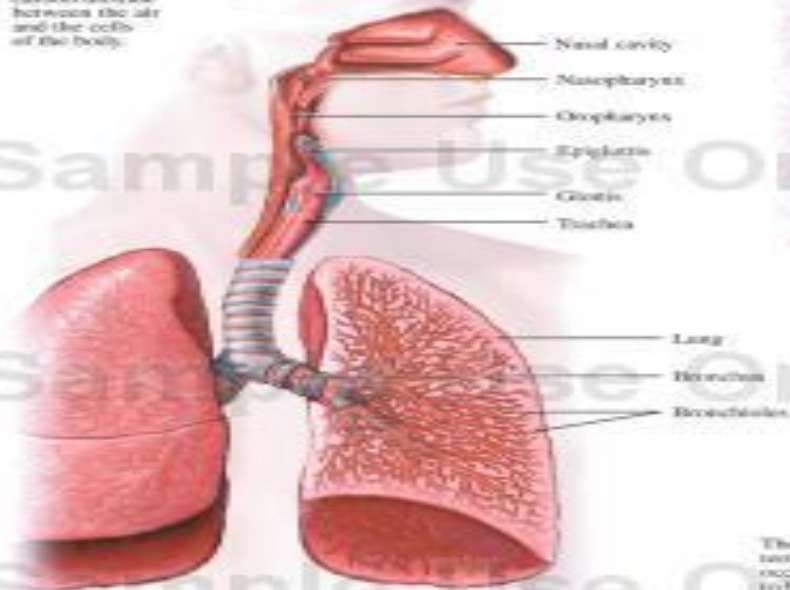


Anatomy and Functions of the Respiratory System

The Respiratory System

The respiratory system consists of all the air passages from the nose to the pulmonary alveoli. Respiration is the exchange of oxygen and carbon dioxide between the air and the cells of the body.



Anatomy and Functions of the Trachea, Bronchi and Bronchioles

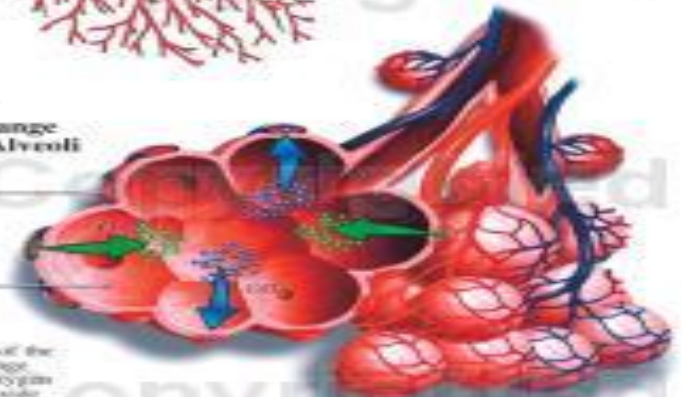


The trachea, bronchi and bronchioles are a complex network of air tubes that bring air in and out of the lungs.

Gas Exchange within the Alveoli

Capillaries

Alveolus



The alveoli are thin-walled sacs of the terminal bronchioles. Gas exchange occurs in the alveoli, allowing oxygen to be discharged with carbon dioxide from the pulmonary capillaries.

For
Critical Care Nursing Students

A.Shahrokhi, MSc.
Qazvin Nursing & Midwifery School
Fall 2016

VENTILATION

RESPIRATION

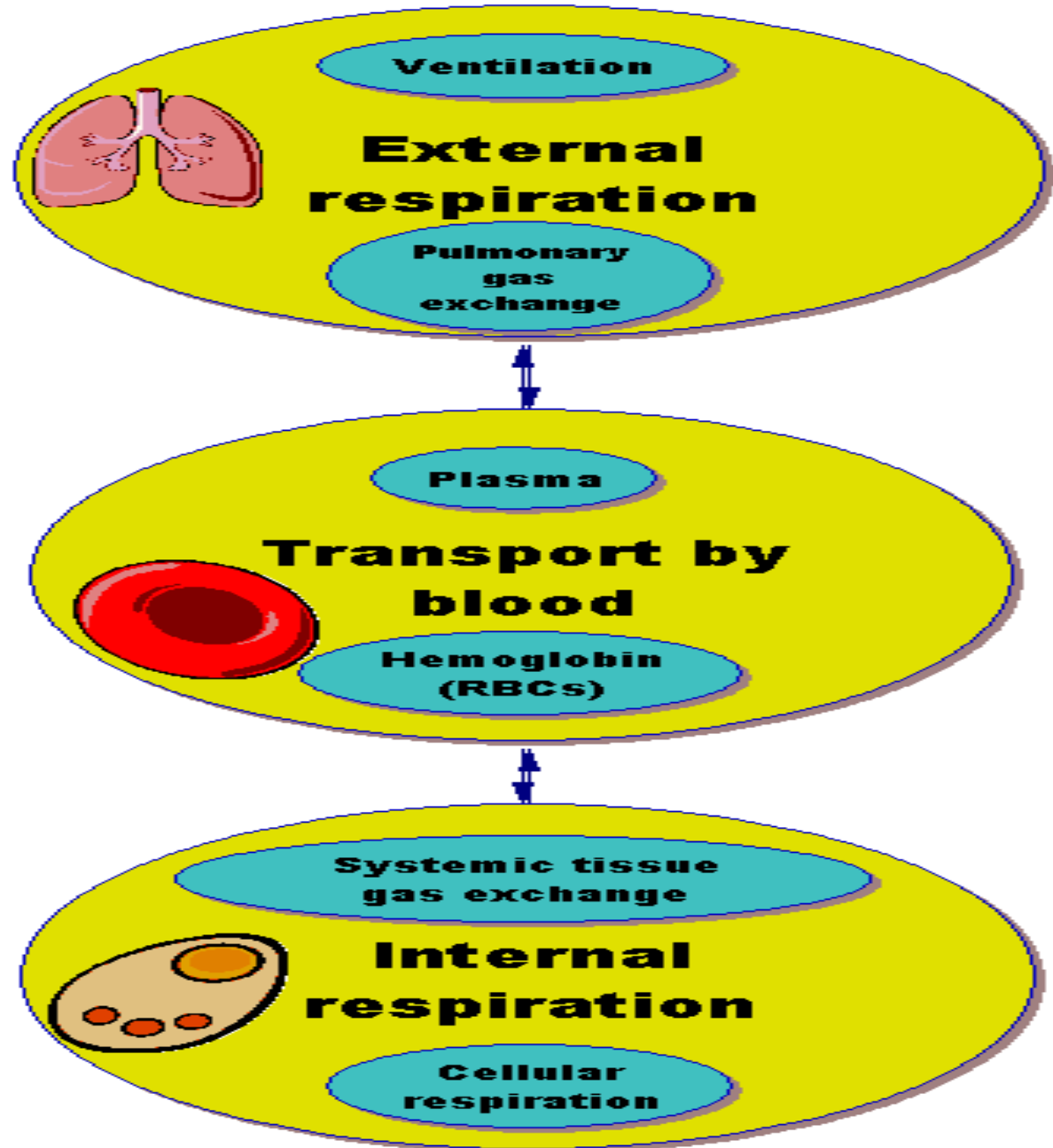
**What's
RESPIRATION?**

BREATHING

OKY GENERATION



**The "big picture"
of respiration**





Airways

**Bony
Structure**

Lungs



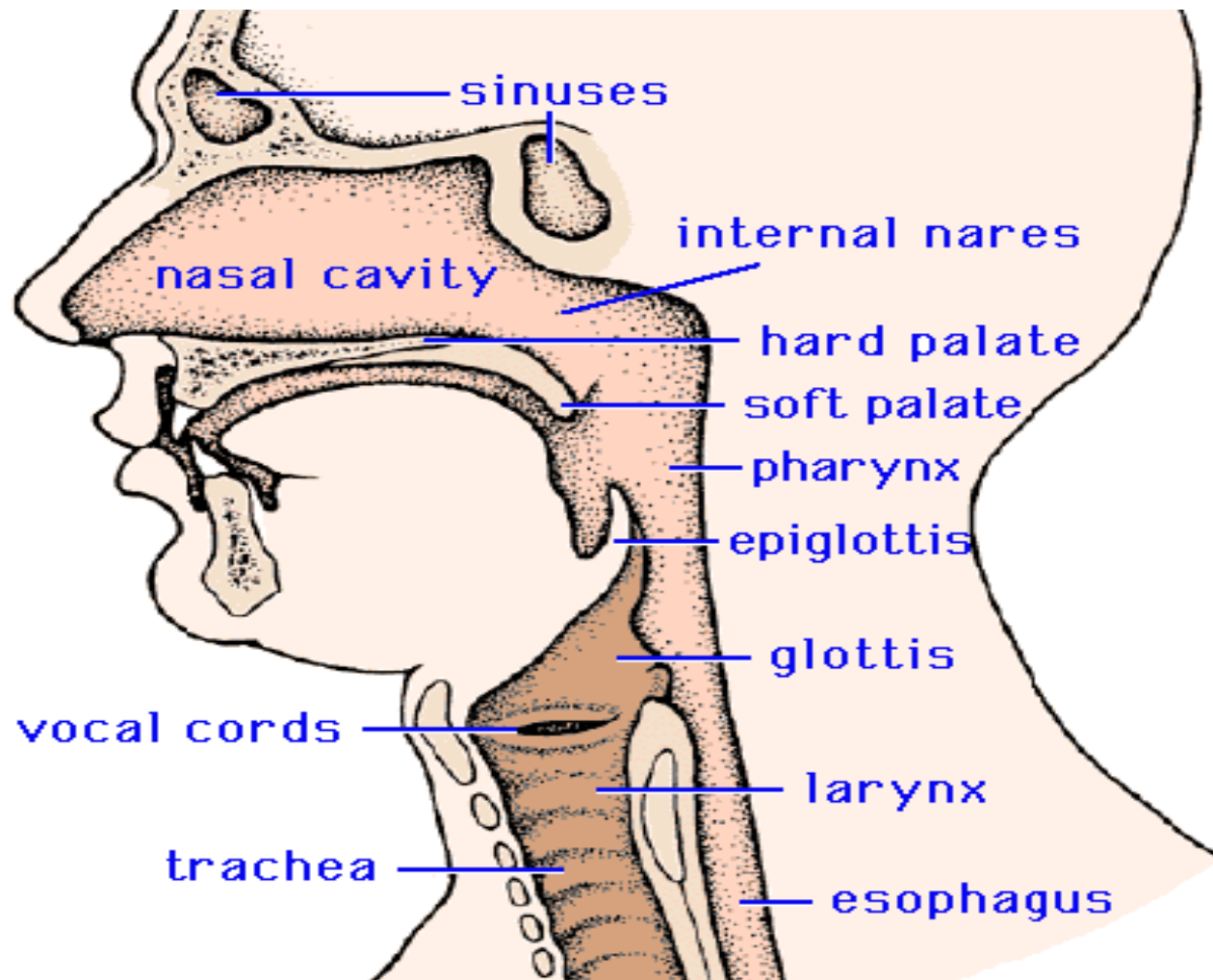
VENTILATION

Pleura

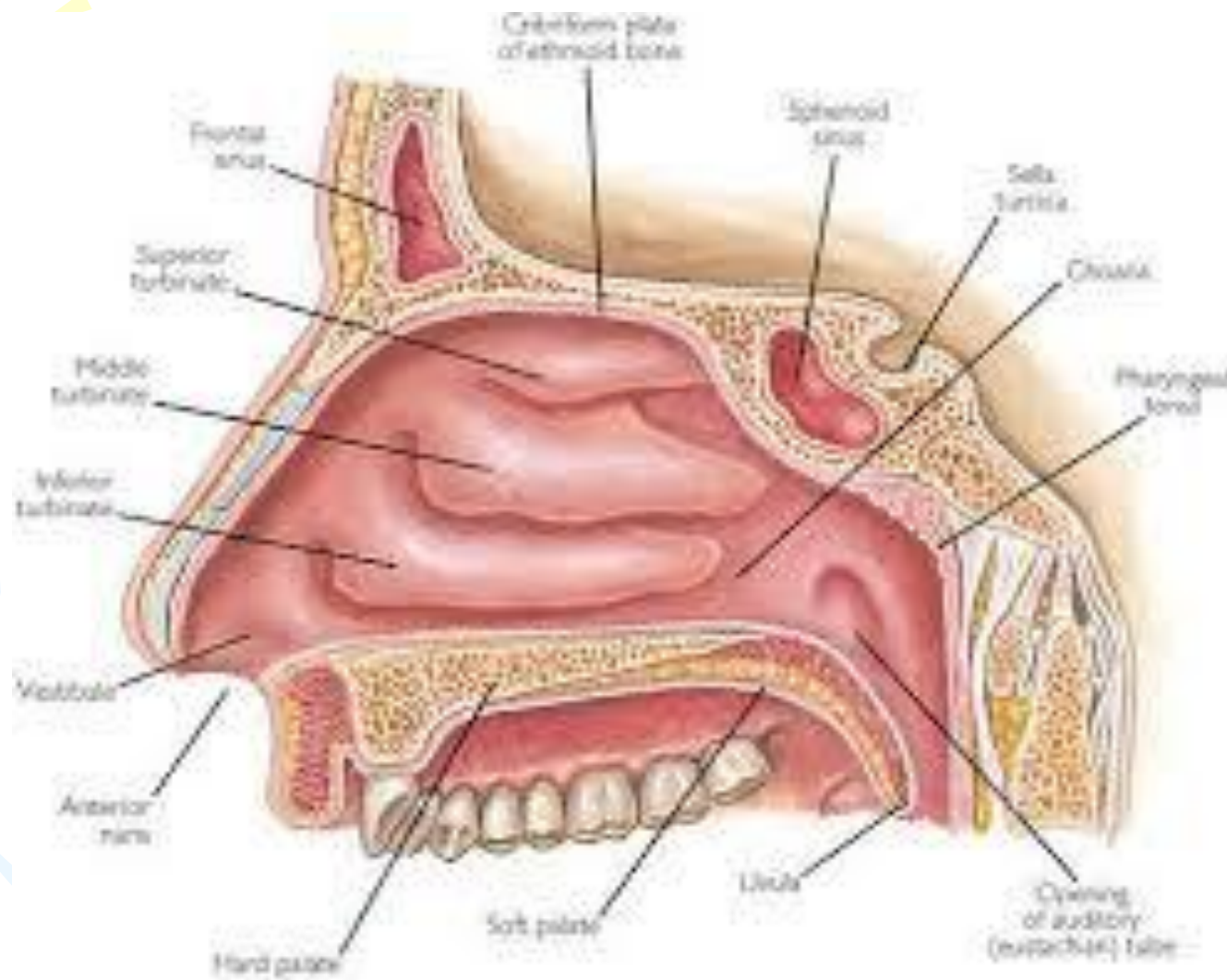


**Respiratory
Muscles**

**Nervous
System**



UPPER RESPIRATORY TRACT



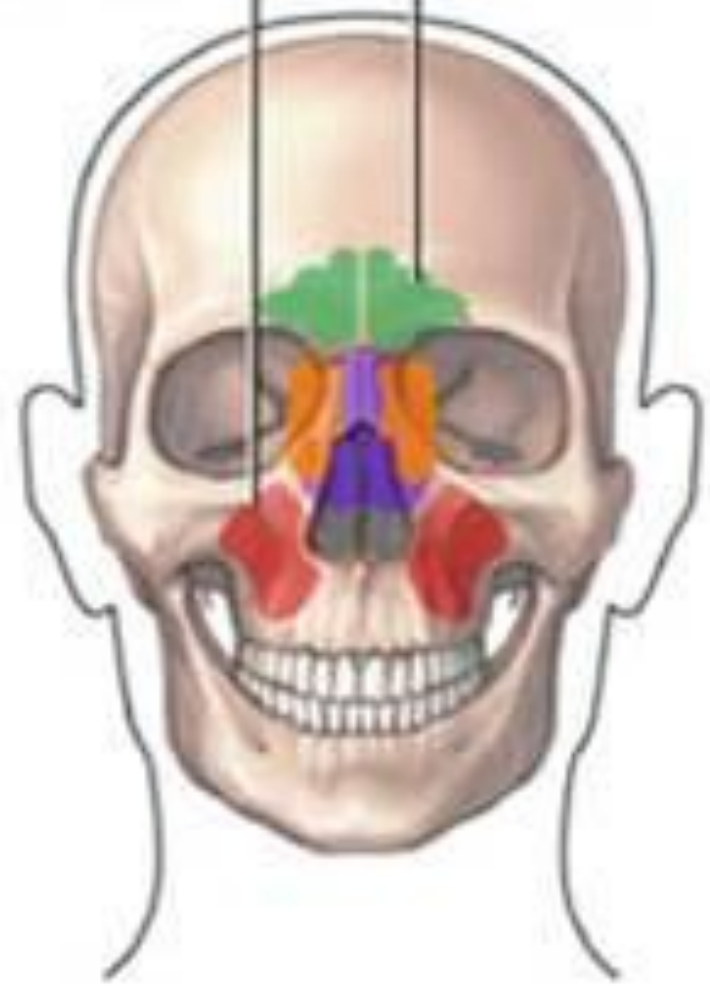
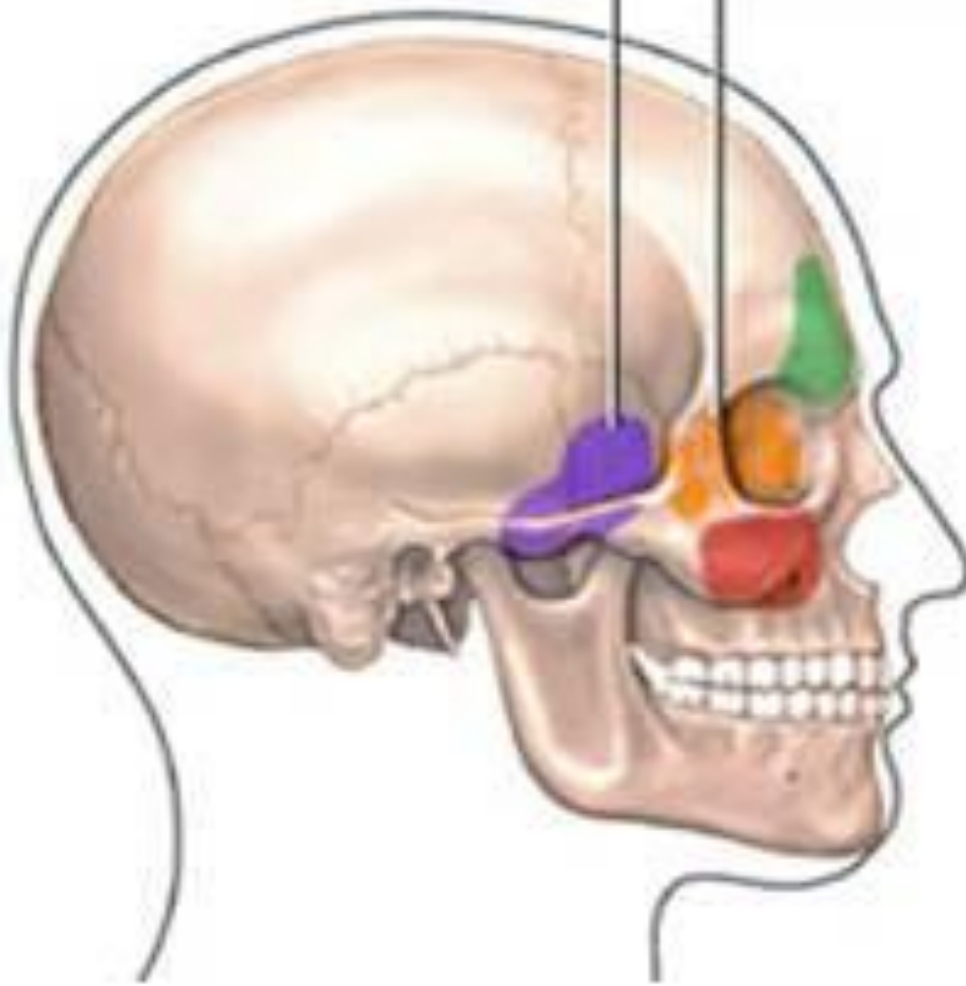
NASAL CAVITY

Sphenoidal sinus

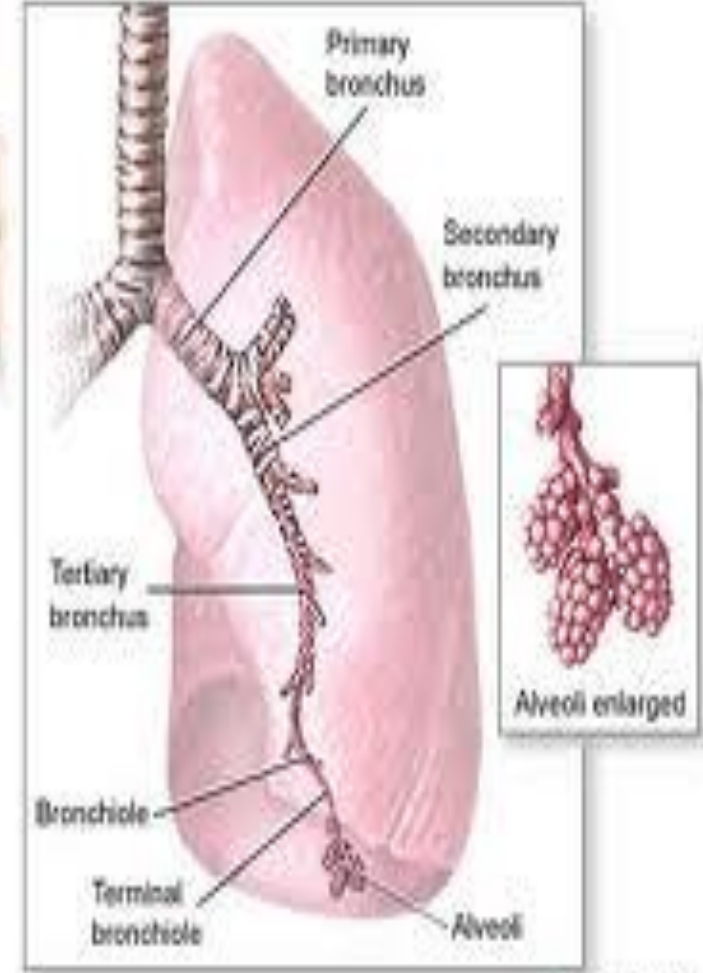
Ethmoidal sinus

Maxillary sinus

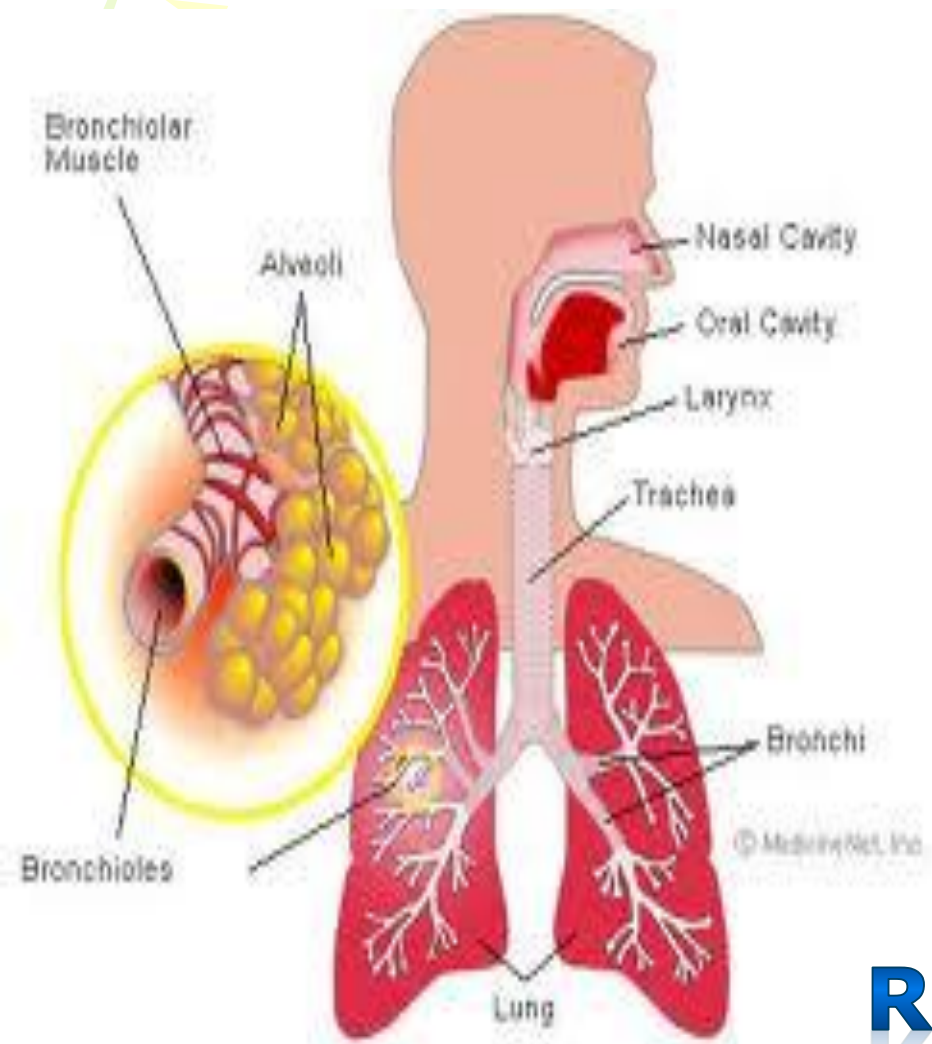
Frontal sinus



PARANASAL SINUSES



ADAM.



LOWER RESPIRATORY TRACT

Mucociliary Scala

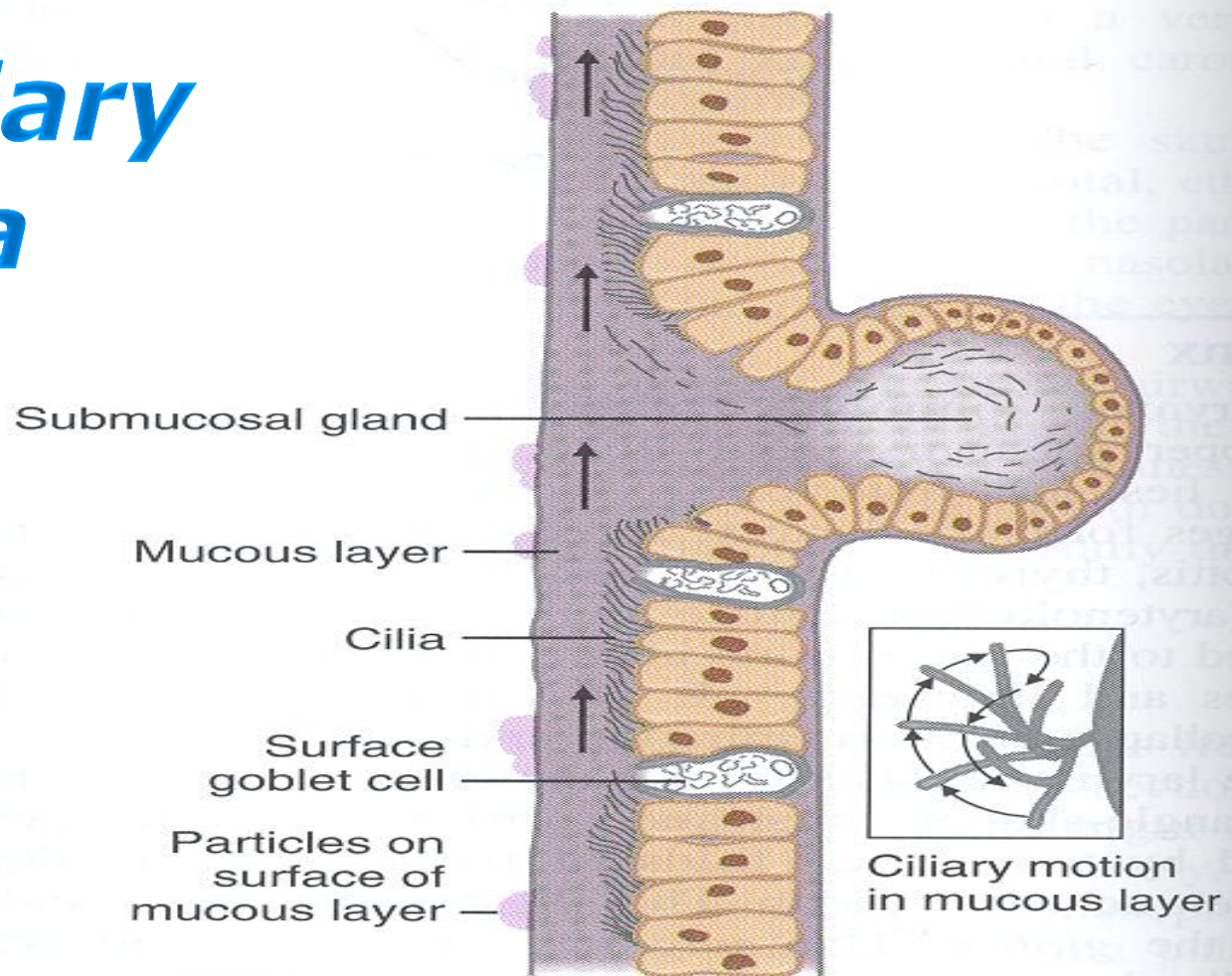
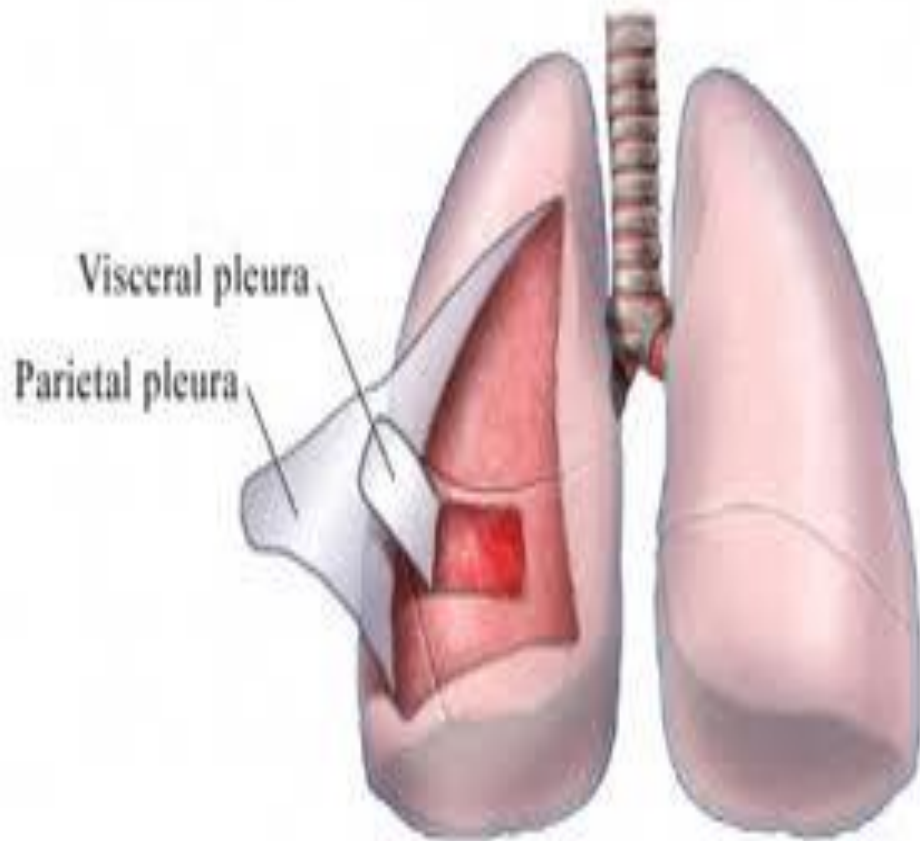
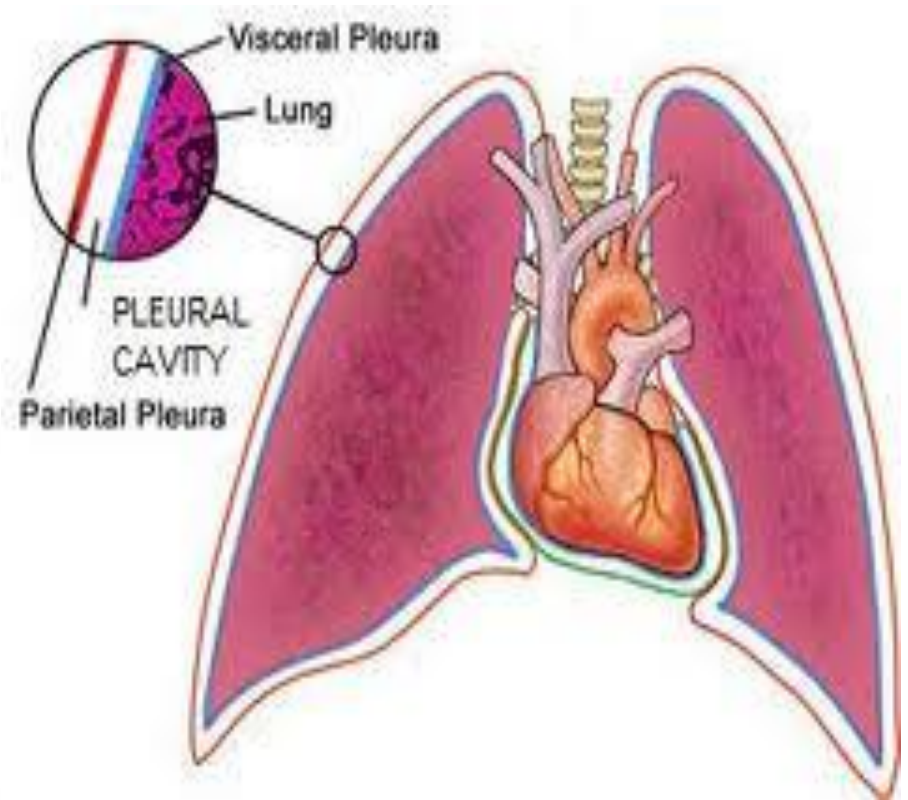
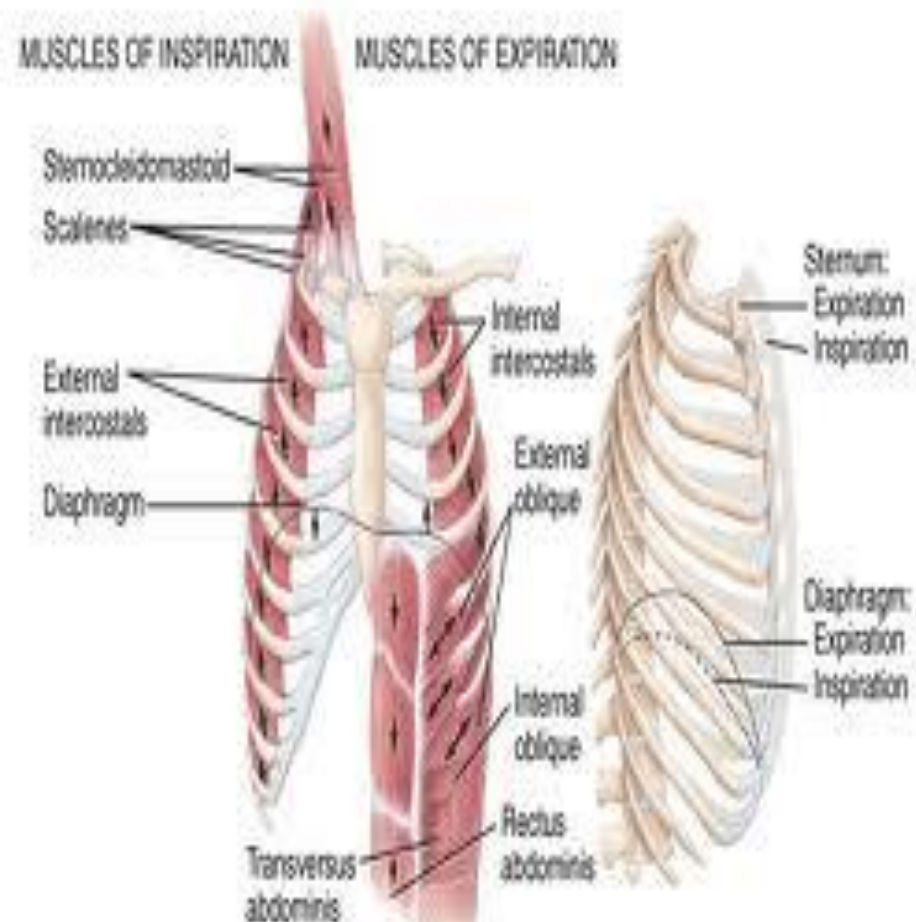


FIGURE U13–3 The mucociliary blanket is an important respiratory defense mechanism. Mucus is secreted by surface goblet cells. About 100 ml of mucus is normally secreted each day by the submucosal glands. Mucus covers the epithelial lining of the tracheobronchial tree in two layers—the watery solution layer close to the mucosal surface and the thicker gel layer. The cilia (hair-like projections) beat in an upward direction toward the upper airway. Particulate matter is trapped on the mucous layer and moved upward by the cilia. Debris-laden mucus is then either swallowed or expectorated as sputum.



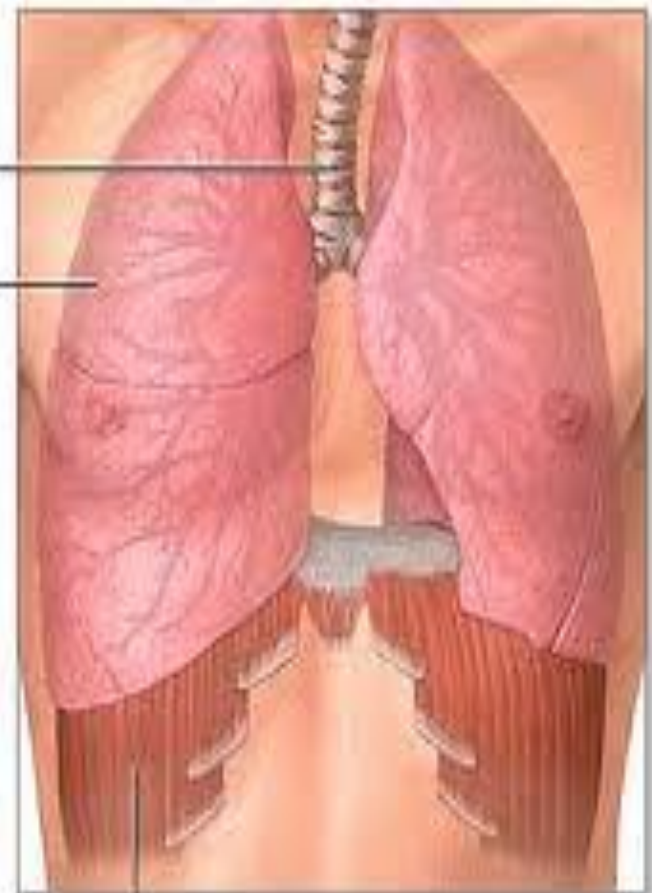
PLEURA

Respiratory Muscles



Trachea

Lung

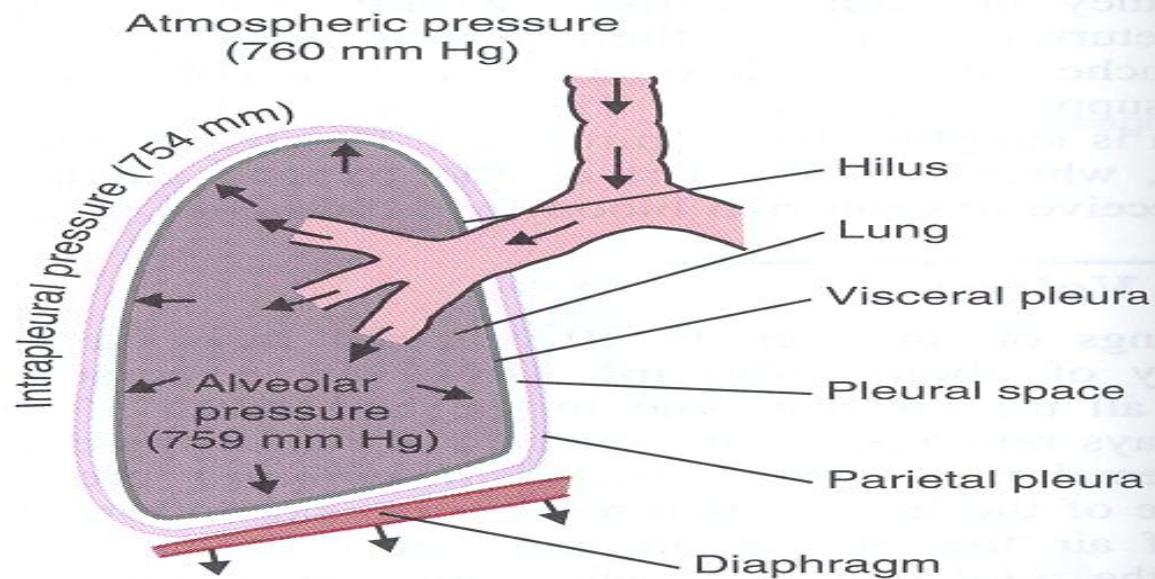


Diaphragm

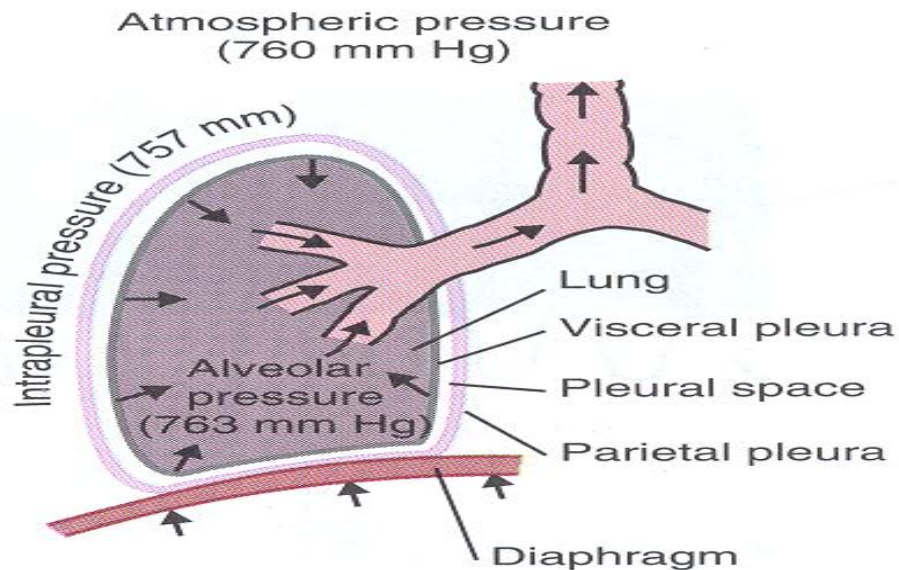
ADAM

Bony Structure



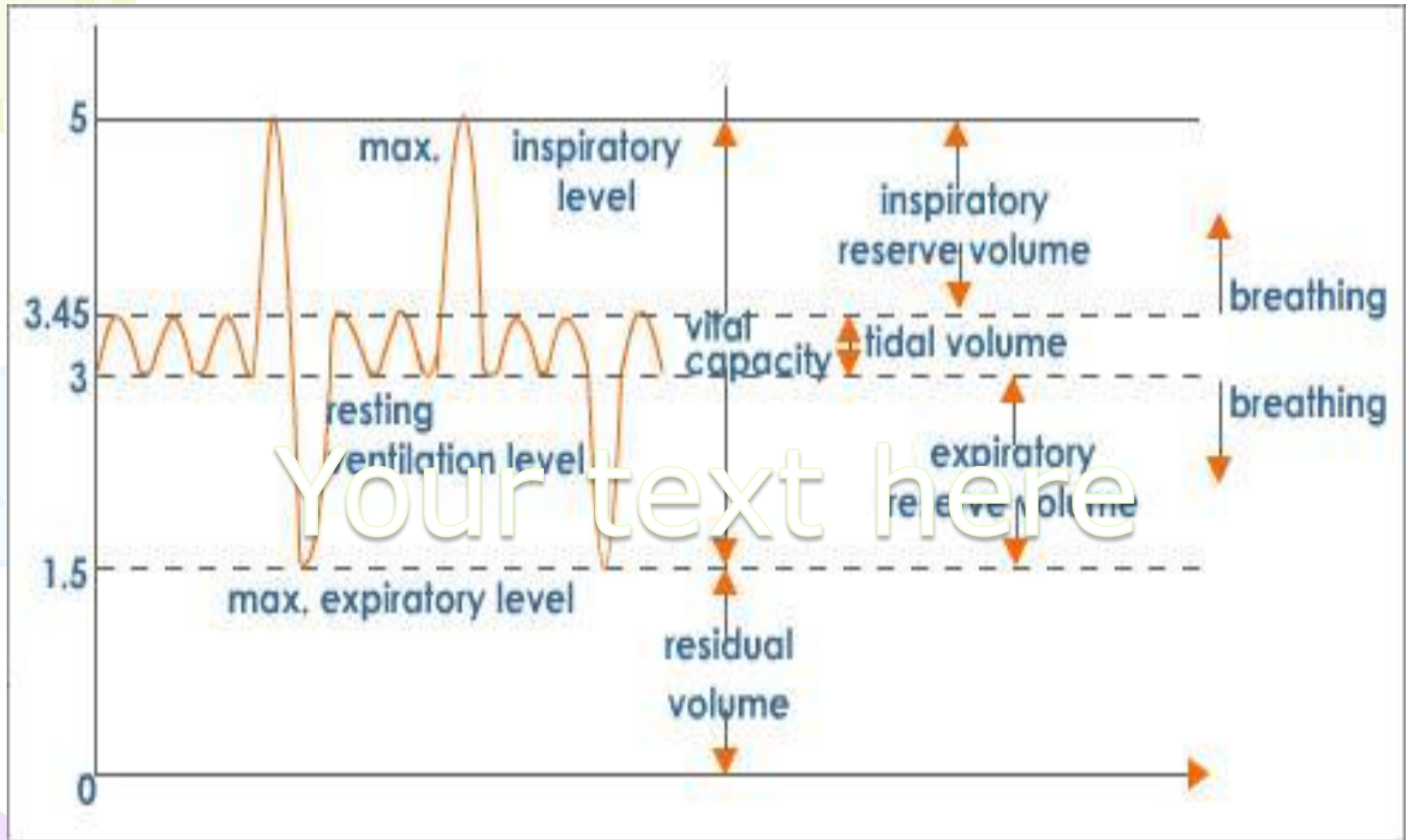


NORMAL INSPIRATION



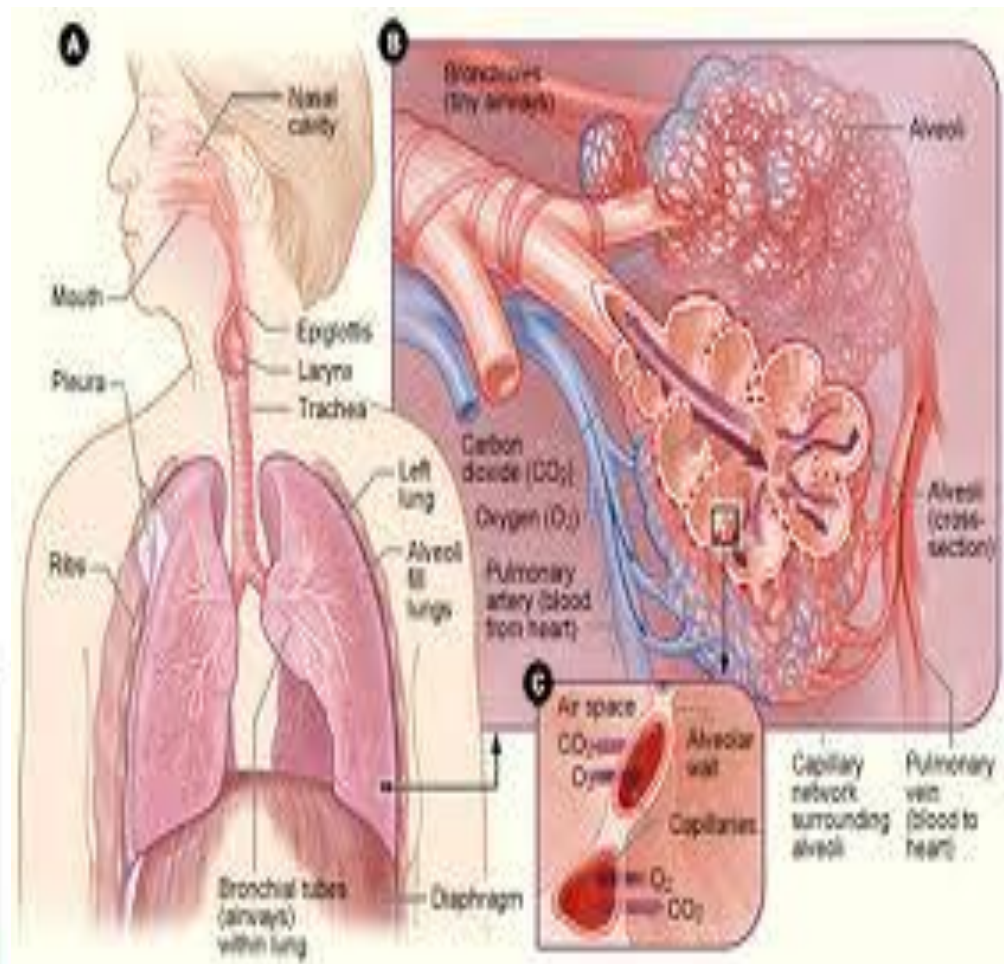
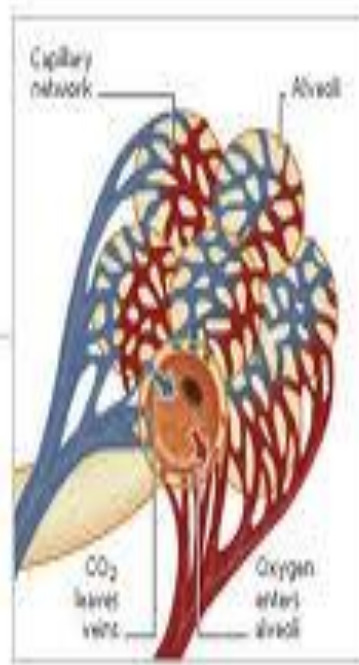
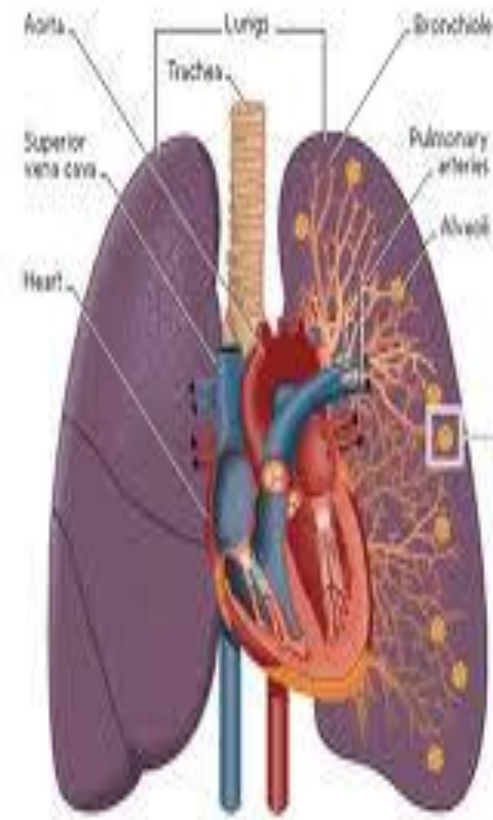
NORMAL EXPIRATION

FIGURE U13-7 Normal inspiration and expiration.



Lung Volumes & Capacities

Alveolocapillary Membrane



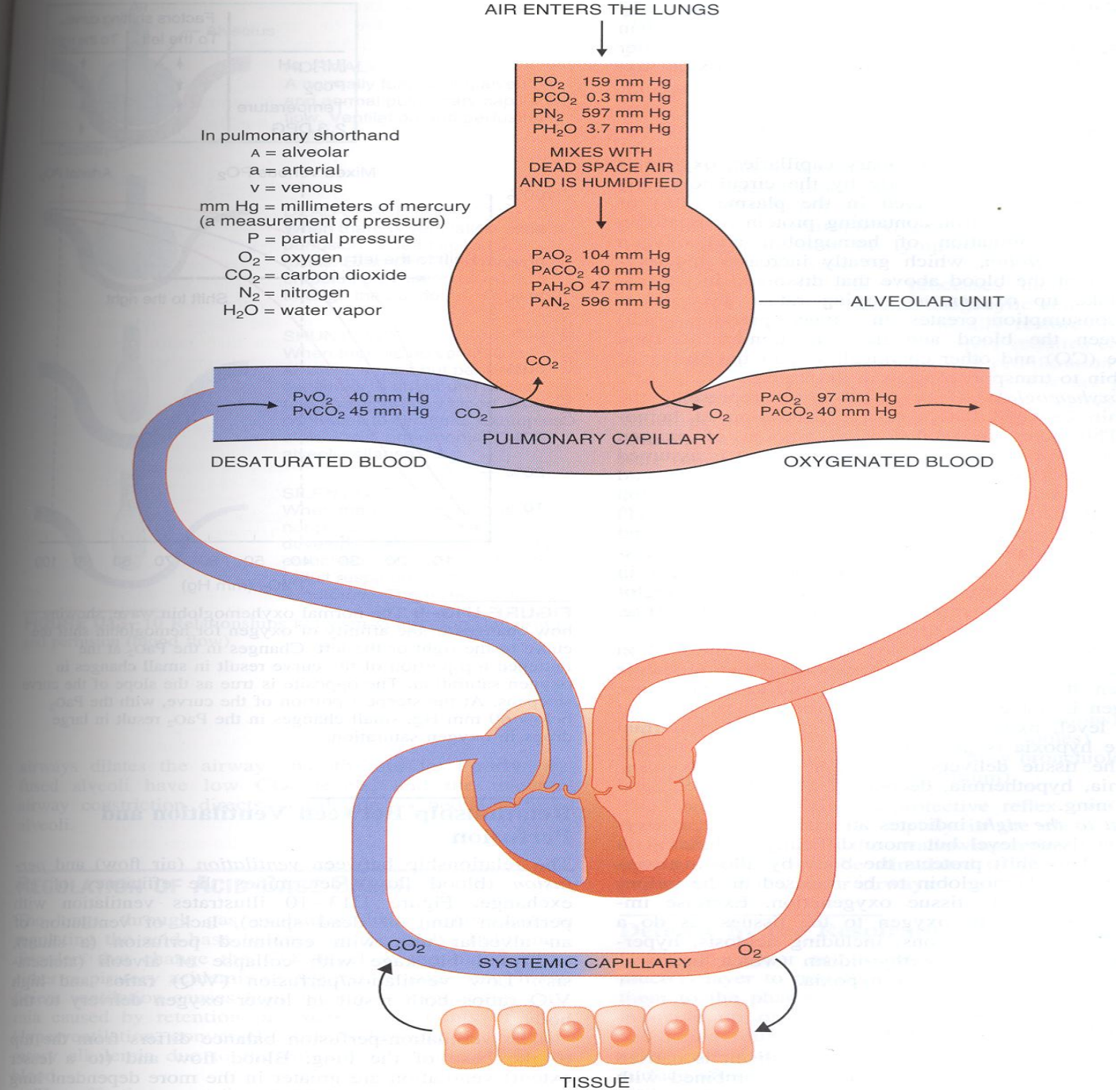


FIGURE U13-8 Partial pressures of gases during normal respiration.

PERFUSION & DIFFUSION

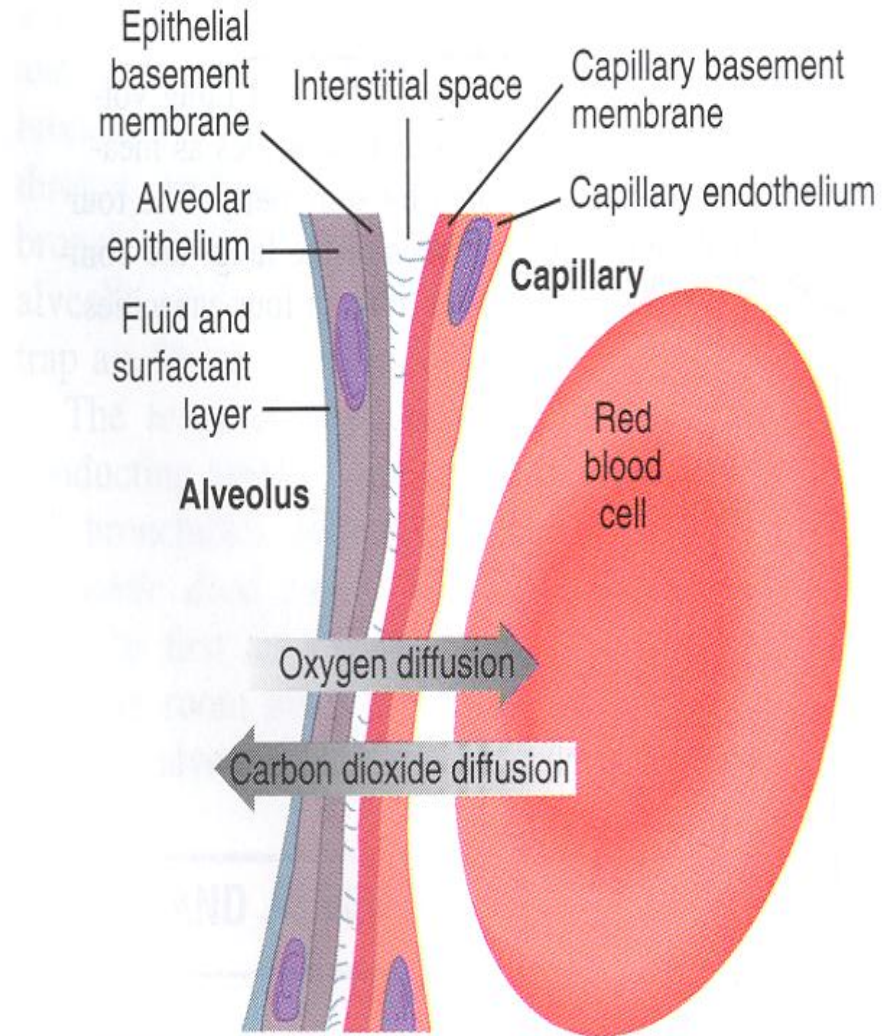


FIGURE U13-6 The ultrastructure of the respiratory membrane, where oxygen is exchanged.



V/Q Ratio Mismatching

Shunting

Dead Space

PULMONARY SHUNTING

A Normal Alveolar-Capillary Unit



B Anatomic Shunt

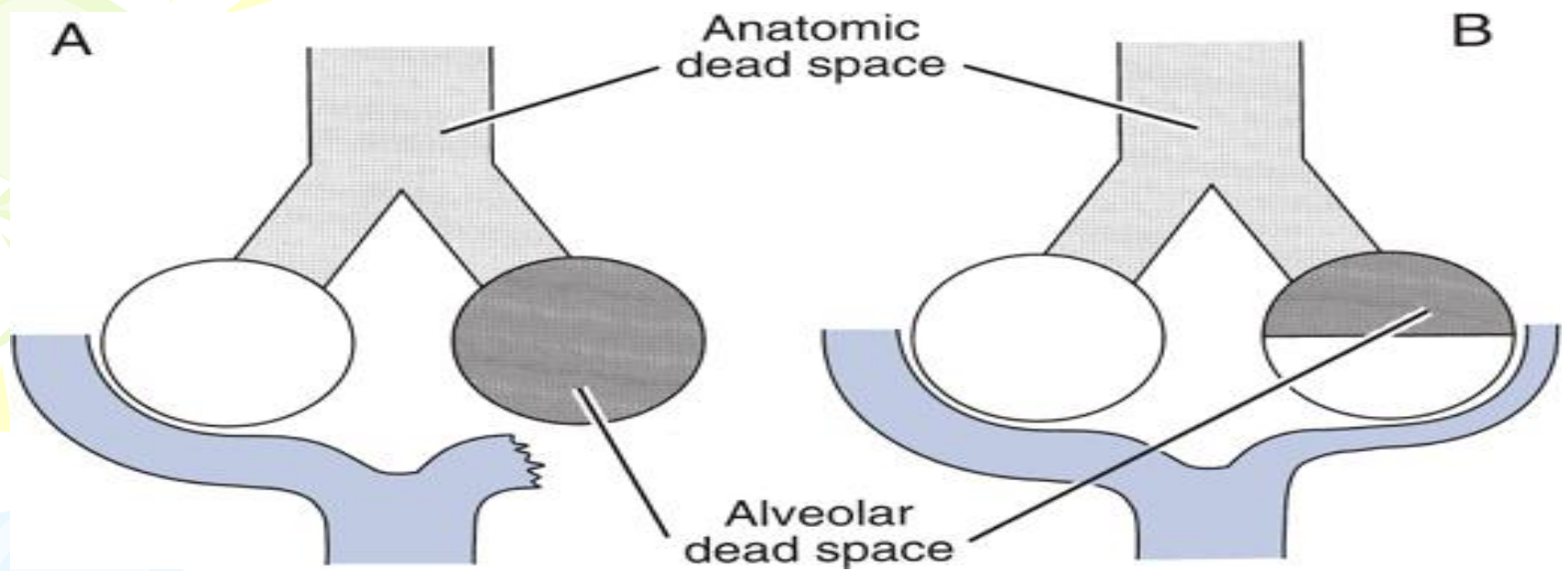


C Types of Capillary Shunts



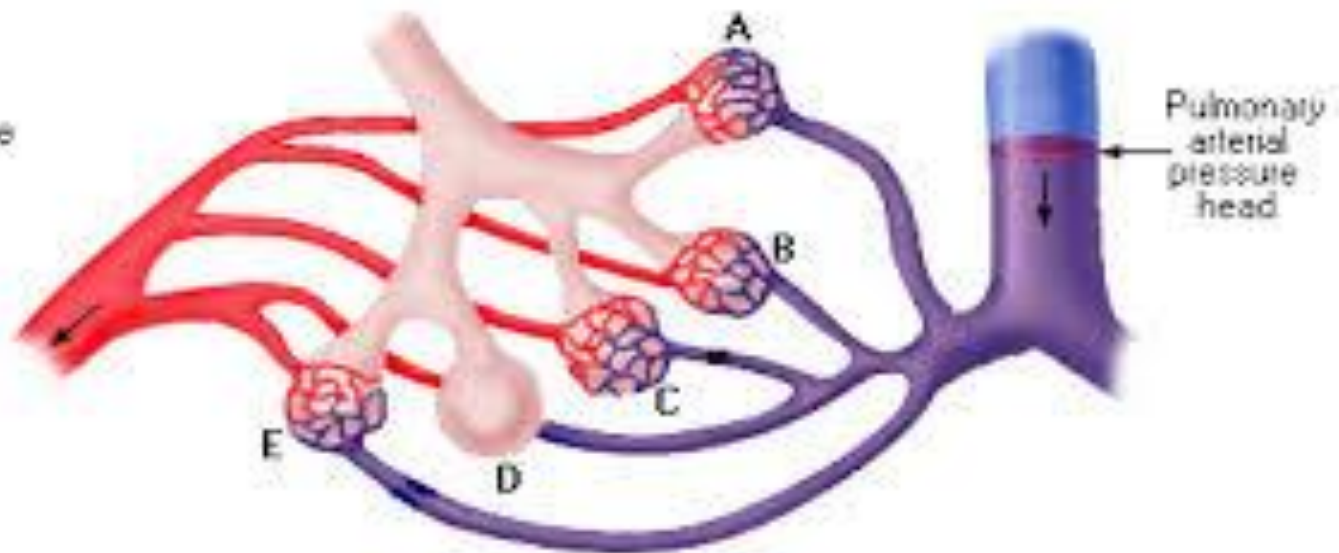
D Types of Shunt-Like Effects





Alveolar Dead Space

- A = Hydrostatic pressure failure
- B = Normal
- C = Embolus
- D = Emphysema
- E = Pre-capillary constriction



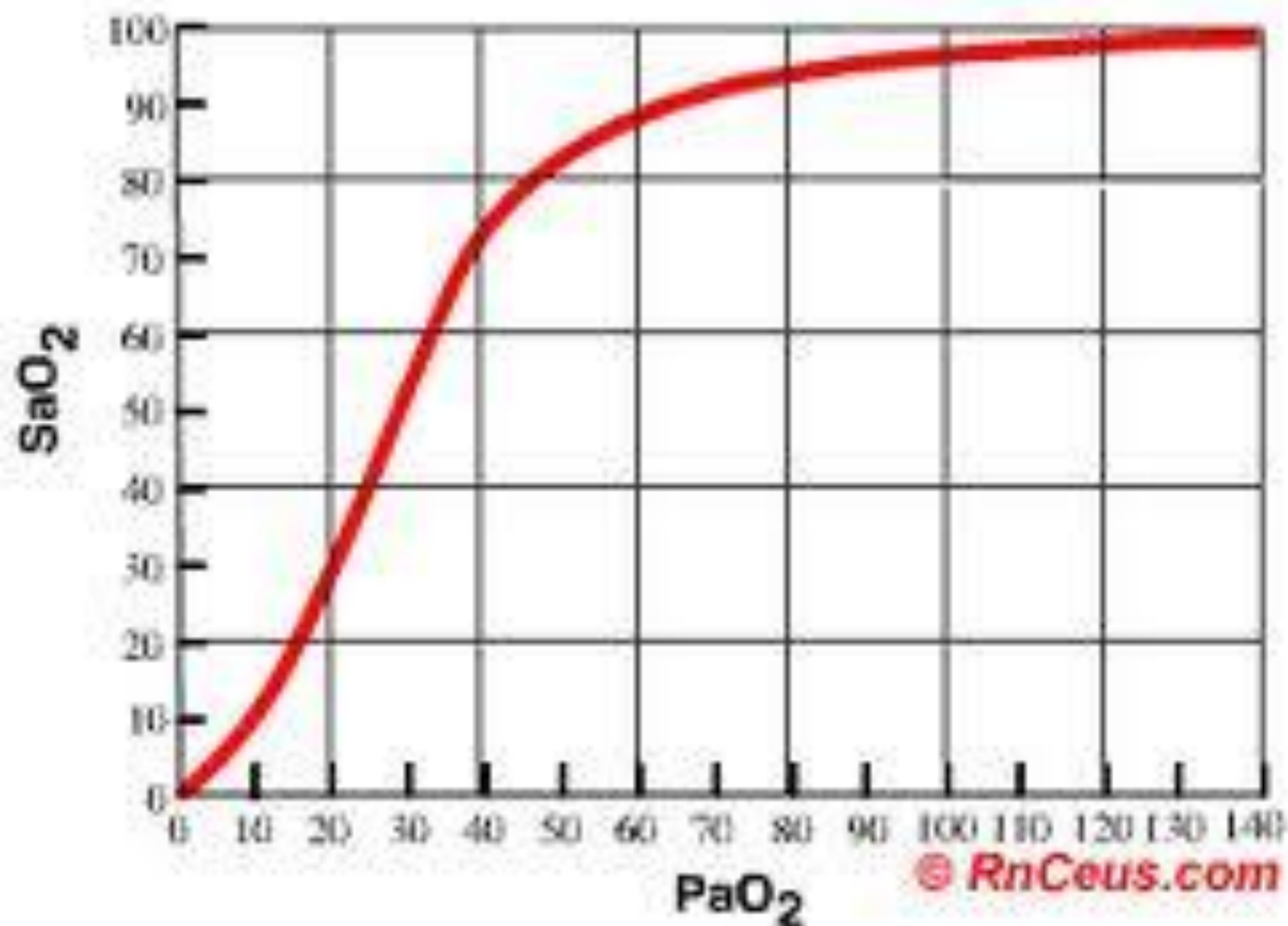


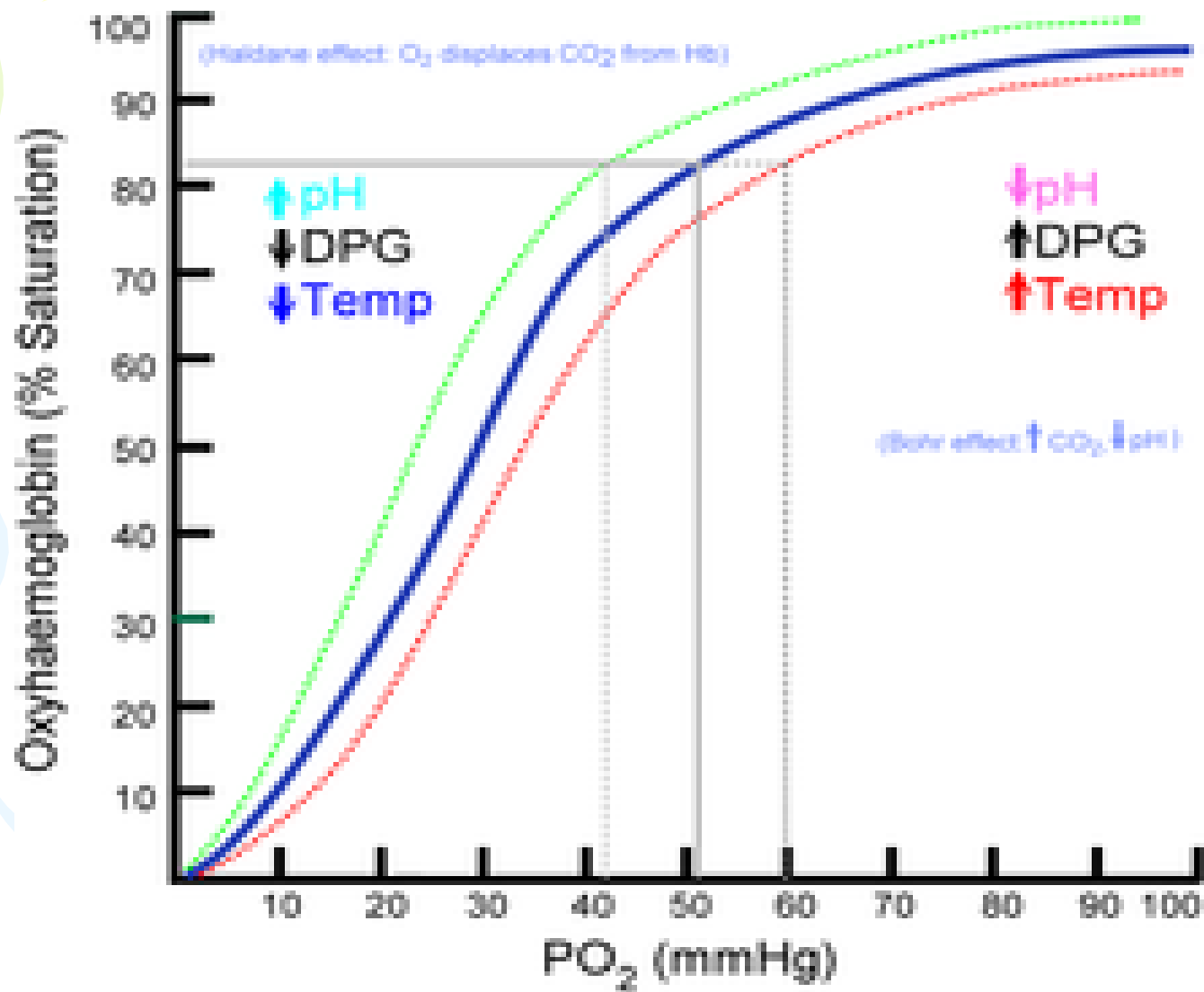
Gas Transportation

**O₂ : -Plasma(S)
- HbO₂**

**CO₂ : - Plasma(S)
- HbCO₂
- Co₃H**

OxyHemoglobin Dissociation Curve







CORTEX

NEURAL PONS

CONTROL


OF

BREATHING

MEDULLA



**CENTRAL
CHEMORECEPTORS**



***CHEMICAL
CONTROL OF BREATHING***



**PERIPHERAL
CHEMORECEPTORS**

Control of Breathing

